

North Dakota Attorney General



Wayne Stenehjem



Crime Laboratory Division

Toxicology Section Services

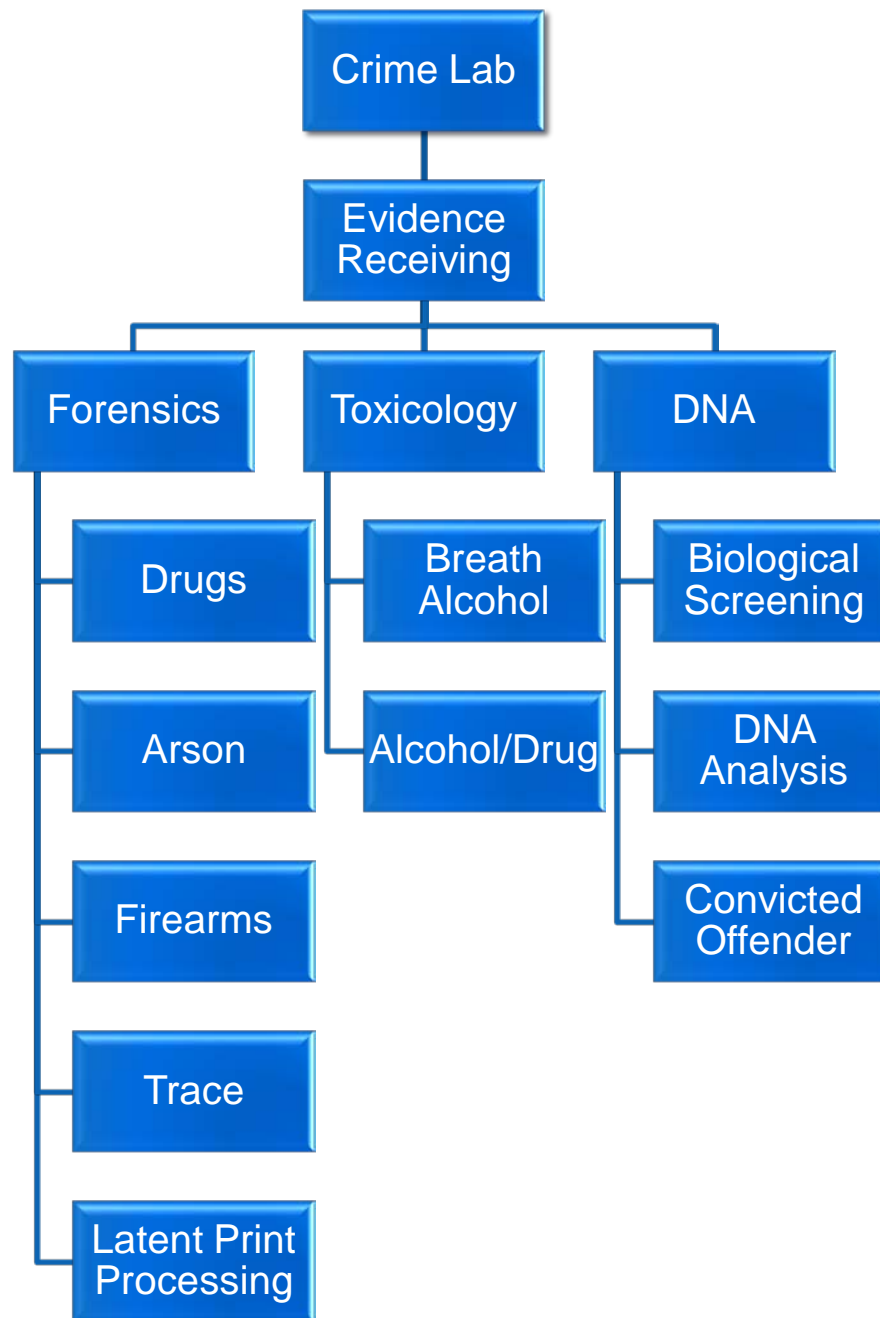
NDDOT LAW ENFORCEMENT SUMMIT
March 8, 2012

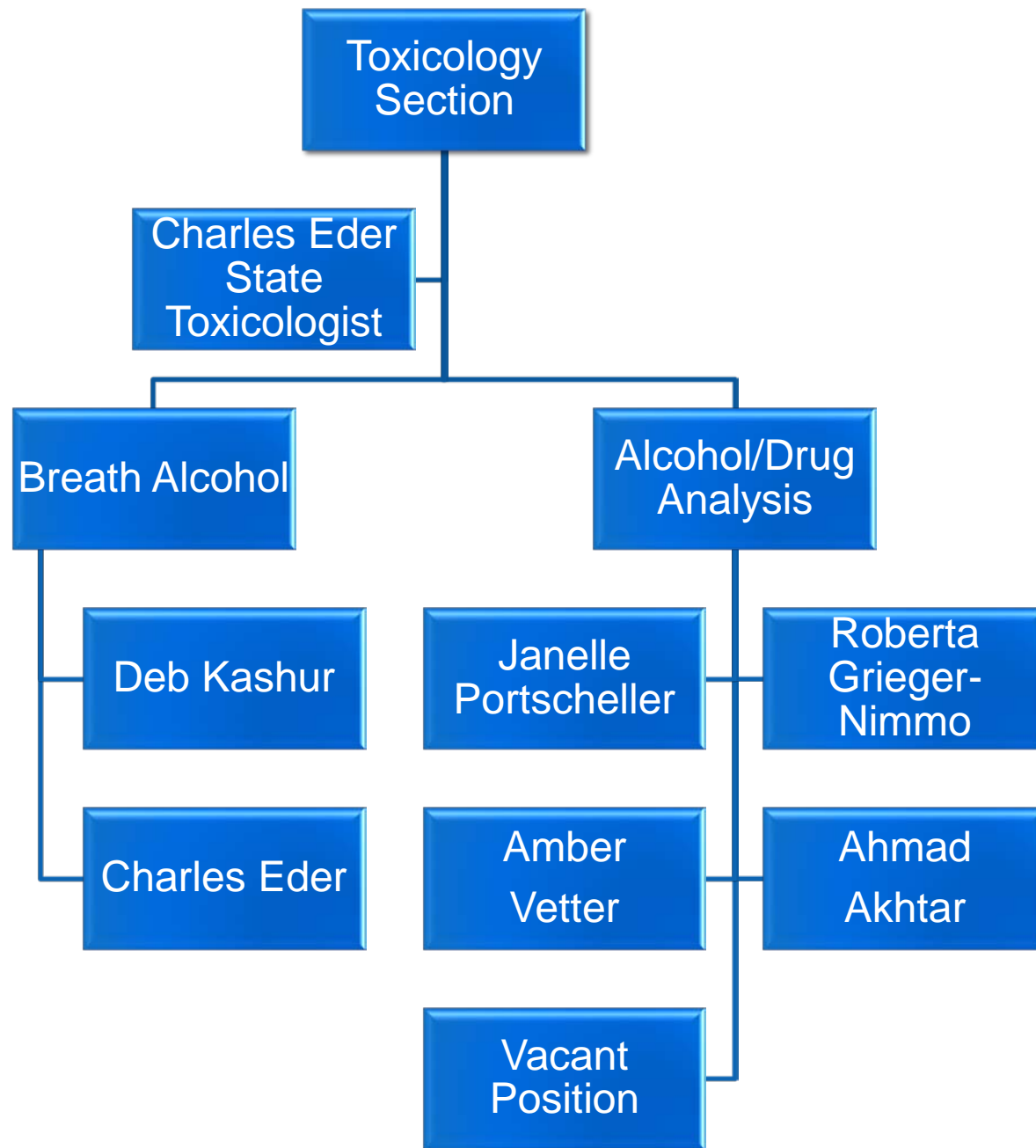
Janelle Portscheller
Forensic Scientist

North Dakota Office of Attorney General
Crime Laboratory Division
Toxicology Section

Outline

- Organization of Crime Laboratory
- Toxicology Section
 - Sample Submitting
 - Sample Receiving
 - Sample Analysis
 - Alcohol/Volatile Analysis
 - Carboxyhemoglobin Analysis
 - Drug Screening Analysis
- Current Challenges & Future Goals



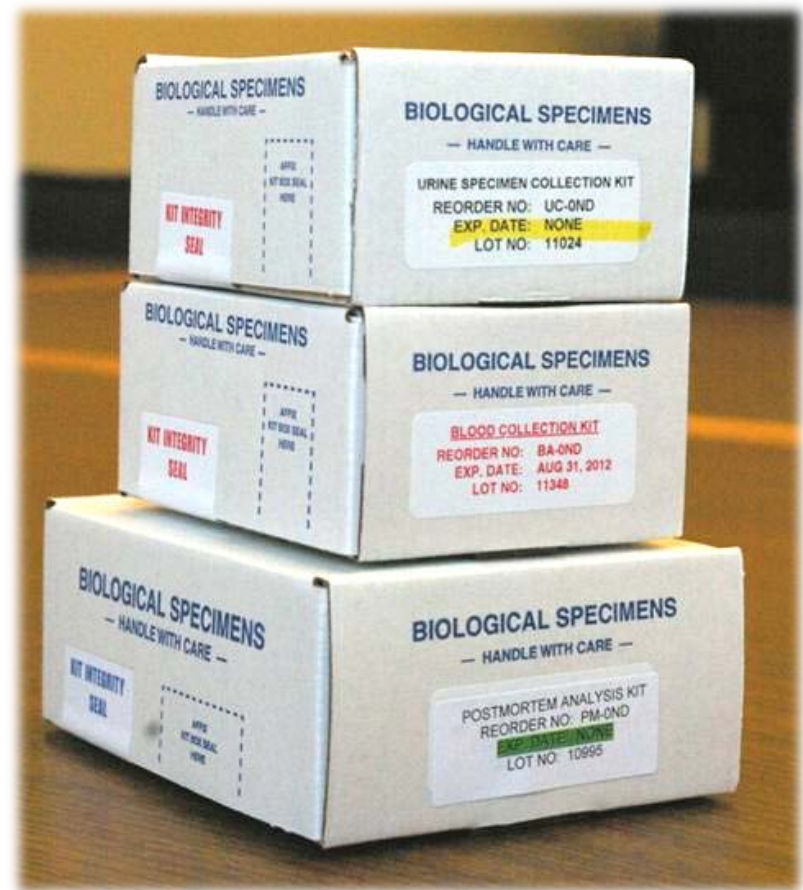


Toxicology Case Work

- ~ 4000 cases per year
- DUI & DUI-D
- State Medical Examiner
- County Coroner
- Traffic Fatalities
 - Decedents
 - Survivors
- Drug Facilitated Sexual Assaults
- Officer Investigations
- Other Investigations; upon approval of Laboratory Director
- **No** Analysis for Ingestion Cases

Toxicology Specimen Collection Kits

- Urine Collection Kit
 - Form 104-U
 - Urine Container
 - Specimen & Kit Seals
- Blood Collection Kit
 - Form 104
 - Medically Qualified Personnel
 - Grey Top Vacutainer, Needle, Needle Guide, Disinfectant
 - Specimen & Kit Seals
- Postmortem Collection Kit
 - Coroner's Request for Toxicological Analysis
 - Vacutainer Tubes, Urine Container, Syringes & Needles
 - Specimen & Kit Seals



Specimen Seals & Kit Seals

<u>Peterson, Zachary</u> Subject's Name		SPECIMEN SECURITY SEAL  BIOHAZARD (PLACE OVER BOTTLE CAP/BLOOD TUBE STOPPER)	<u>mJ</u> Investigating Officer's Initials
<u>AN, RN</u> Collector's Initials			<u>Bismarck PD</u> Agency/Police Dept.
<u>02/17/12</u> Date	<u>10:24 AM</u> Time		<u>#445</u> Identification No.

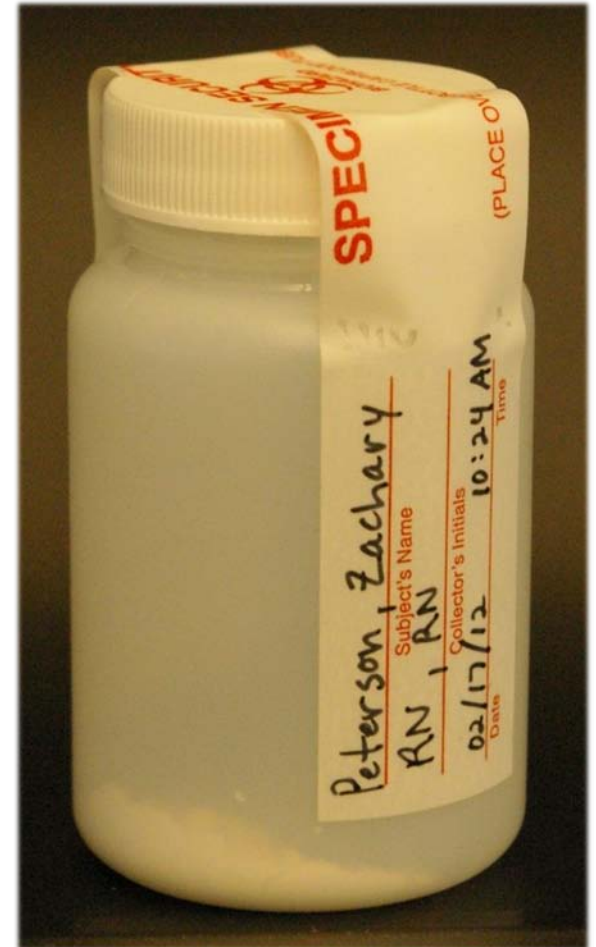
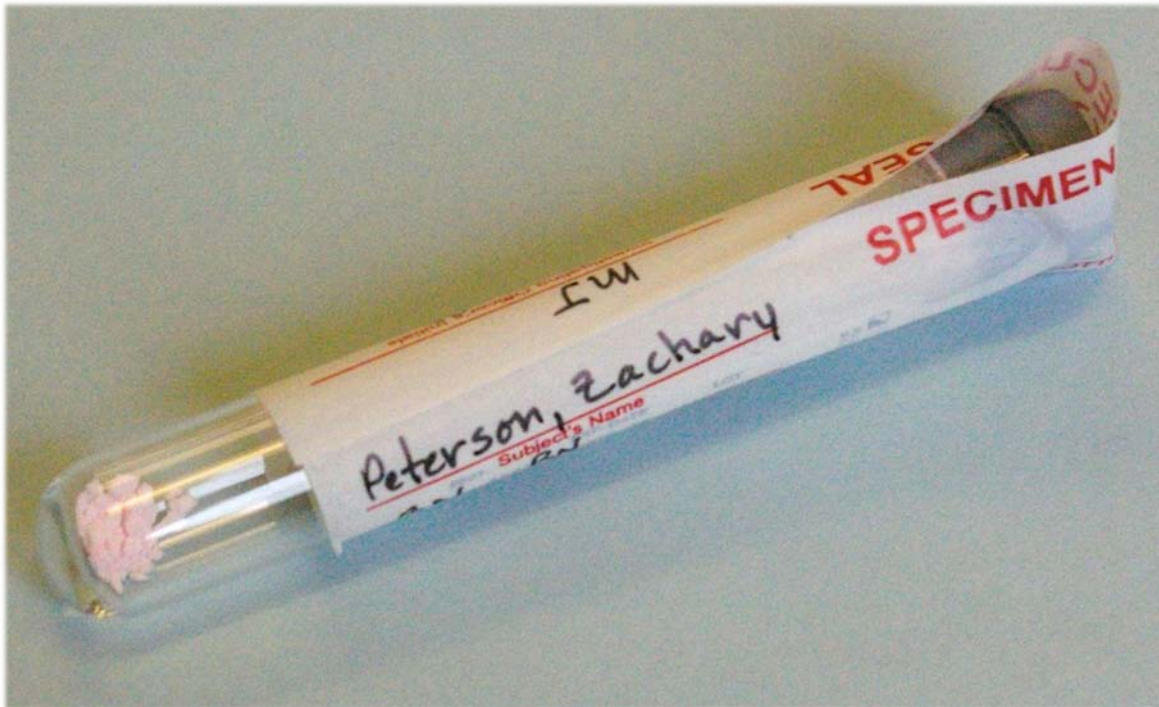
Mfg. by TRI-TECH INC. (800) 438-7894	KIT BOX SHIPPING SEAL
	DATE SEALED: <u>02/17/12</u>
	SEALED BY: <u>m. Jones #445</u> (SIGNATURE)

- Completed Specimen Security Seal
- Completed Blood and Urine Kit Shipping Seal
- Postmortem Kit Seal

KIT SHIPPING SEAL
KIT SHIPPING SEAL

Sealed Specimens

- Blood & Vitreous Vacutainers
- Urine Containers



Form 104



SUBMISSION FOR BLOOD (104)
Office of Attorney General, Crime Laboratory Division
2641 East Main Avenue, P.O. Box 937
Bismarck, ND 58502-0937 • (701) 328-6159
SFN 50491 (11/10)

Kit Lot No. 11348 Kit Exp. Date AUG 31, 2012
Blood Tube Lot No. 026823 Exp. Date AUG 31, 2012
Disinfectant Lot No. 11001949 Exp. Date JUL 31, 2013

Please Print All Information.

Subject (Last, First, Initial)		Birth Date (Month/Day/Year)	Height Weight	Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female
Check One: <input type="checkbox"/> Arrested for DUI/APC <input type="checkbox"/> Personal Request <input type="checkbox"/> Other (Specify) _____		Driver's License Number		State
Specimen: <input type="checkbox"/> Blood <input type="checkbox"/> Other _____		Analysis Requested: <input type="checkbox"/> Alcohol <input type="checkbox"/> Drug Screen (List Meds/Suspected Drugs _____)		
Specimen Submitted By (Officer's Name)		Submitting Agency (Law Enforcement or Other Agency)		
Submitting Agency Address		City	State	Zip Code
Remarks				County of Arrest

To Be Completed By Blood Specimen Collector

Check Each Item Performed: <input type="checkbox"/> Used an Intact Kit <input type="checkbox"/> Observed Powder in Blood Tube <input type="checkbox"/> Used Disinfectant Provided in Kit <input type="checkbox"/> Used Needle, Guide and Tube Provided in Kit <input type="checkbox"/> Drew Blood into Tube and Inverted Several Times <input type="checkbox"/> Alternate Item(s) Used _____	
Time Specimen Obtained: _____ <input type="checkbox"/> A.M. <input type="checkbox"/> P.M.	Date Specimen Obtained: _____ (Month/Day/Year)
Remarks	
I certify that I withdraw the blood specimen from the above subject and the information given in this section is true and correct. _____ Specimen Collector's Signature _____ Please Print Specimen Collector's Name and Title _____ Facility Where Sample Was Drawn	

For Laboratory Use - Do Not Write in This Space

Laboratory Case Number	
Specimen Received From: <input type="checkbox"/> Postal Delivery <input type="checkbox"/> Other _____	
Time Specimen Received: _____ <input type="checkbox"/> A.M. <input type="checkbox"/> P.M.	Date Specimen Received: _____ (Month/Day/Year)
Received: <input type="checkbox"/> In a Sealed Container <input type="checkbox"/> In a Labeled Blood Tube By _____ Remarks	

Arresting Officer: Tear Along the Perforation and Retain Bottom Portion for Your Records.

To Be Completed By Specimen Submitter

Subject (Please Print Name-Last, First, Initial)	Time Specimen Obtained: _____ <input type="checkbox"/> A.M. <input type="checkbox"/> P.M.	Date Specimen Obtained: _____ (Month/Day/Year)
Specimen Sealed By (Please Print Name-Last, First, Initial)	Time Specimen Sealed: _____ <input type="checkbox"/> A.M. <input type="checkbox"/> P.M.	Date Specimen Sealed: _____ (Month/Day/Year)

Check Each Step Performed:

- ☐ Used an Intact Kit.
- ☐ Affixed Completed Specimen Label/Seal Over the Top and Down the Sides of the Blood Tube.
- ☐ Placed the Blood Tube Inside the Blood Tube Protector and Then Placed it in the Plastic Bag Provided. **(Do Not Remove Liquid Absorbing Sheet.)**
- ☐ Placed the Plastic Bag and Completed Top Portion of This Form in the Kit Box and Closed it.
- ☐ Affixed Tamper-Evident Kit Box Shipping Seal on Kit Box.

SAMPLE DISPOSAL WILL OCCUR 12 MONTHS AFTER ANALYSIS REPORTING DATE

I Certify That All Information Given in This Section is True and Correct.

Signed

If Sending by Mail, Affix Postage

BAOND: SUB.15 11/10

Form 104-U



SUBMISSION FOR URINES (104-U)
OFFICE OF ATTORNEY GENERAL, CRIME LABORATORY DIVISION
2641 East Main Avenue, P.O. Box 937
Bismarck, ND 58502-0937 • (701) 328-6159
SFN 50159 (01-10)

Kit Lot No.: 11024
Kit Exp. Date: NONE

PLEASE PRINT ALL INFORMATION

Subject (Last, First, Initial)		Birth Date (Month/Day/Year)	Height Weight	Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female
Check One: <input type="checkbox"/> Arrested for DUI/APC <input type="checkbox"/> Personal Request <input type="checkbox"/> Other (Specify) _____		Driver's License Number		State
Specimen: <input type="checkbox"/> Urine <input type="checkbox"/> Other (Specify) _____	Analysis Requested: <input type="checkbox"/> Alcohol <input type="checkbox"/> Drug Screen <input type="checkbox"/> THC Only	Suspected Drugs: _____		
Time Specimen Obtained _____ <input type="checkbox"/> A.M. <input type="checkbox"/> P.M.	Date Specimen Obtained (Month/Day/Year)	County of Arrest		
Specimen Submitted By (Name)		Submitting Agency		
Submitting Agency Address		City	State	Zip Code
Remarks				

FOR LABORATORY USE – DO NOT WRITE IN THIS SPACE

Laboratory Case Number:	Received: <input type="checkbox"/> In a Sealed Container <input type="checkbox"/> In a Labeled Urine Container
Specimen Received From: <input type="checkbox"/> P.O. Box Delivery <input type="checkbox"/> Other (Specify) _____	Specimen Received By (Name): _____
Time Specimen Received: _____ <input type="checkbox"/> A.M. <input type="checkbox"/> P.M.	Date Specimen Received: (Month/Day/Year)
Remarks	

Arresting Officer: Tear Along the Perforation and Retain Bottom Portion for Your Records.

TO BE COMPLETED BY SPECIMEN SUBMITTER

Subject (Last, First, Initial)	Time Specimen Obtained: _____ <input type="checkbox"/> A.M. <input type="checkbox"/> P.M.	Date Specimen Obtained: (Month/Day/Year)
Specimen Sealed By (Last, First, Initial)	Time Specimen Sealed: _____ <input type="checkbox"/> A.M. <input type="checkbox"/> P.M.	Date Specimen Sealed: (Month/Day/Year)

CHECK EACH STEP PERFORMED

NOTE: If submitting for Drug Analysis Only (not alcohol), begin with STEP 3.

SAMPLE DISPOSAL WILL OCCUR 12 MONTHS AFTER ANALYSIS REPORTING DATE.

- STEP 1 ☐ Instruct the subject to void.
STEP 2 ☐ Establish a minimum 20 minute waiting period.
STEP 3 ☐ Open an intact kit.
STEP 4 ☐ Observed white powder in the specimen container.
STEP 5 ☐ Collect the sample directly into the specimen container. Do not discard powder. Transferring of sample from one receptacle to another is not recommended.
STEP 6 ☐ Instruct the subject to fill the specimen container to about ¾ full. Take necessary precautions to avoid contamination.
STEP 7 ☐ Fill in the label and place it over the top and down the sides of the specimen container.
STEP 8 ☐ Insert the specimen container into the Ziploc bag provided and seal the bag.
STEP 9 ☐ Insert the completed top portion of this form into the kit box.
STEP 10 ☐ Place the bag containing the specimen in the kit box.
STEP 11 ☐ Close the kit box and seal it with the completed kit box shipping seal provided.
STEP 12 ☐ Complete the return address on the kit box top.

**WARNING:
SCREW LID ON
TIGHTLY**

I certify that all information given in this section is true and correct.

Signed _____

IF SENDING BY MAIL, AFFIX POSTAGE.

UC0ND: SUB.6 1/10

Coroner & Traffic Fatality Request Form



Coroner and Traffic Fatality Request for Toxicological Analysis
Office of Attorney General, Crime Laboratory Division
2641 East Main Avenue, P.O. Box 937
Bismarck, ND 58502-0937 • (701) 328-6159
SFN 50494 (1/10)

Kit Lot No. 10995

Decedent Name: _____ ☐ Male ☐ Female
Last First Middle Initial

Driver's License: _____ State: _____

Suspected Cause of Death: _____

Medication/Drugs Suspected: _____

Specimen Obtained By: _____

Send Replacement Kit To: _____

	Hour	Month	Day	Year
Date of Birth				
Time and Date of Death				
Time and Date of Specimen Collection				
<input type="checkbox"/> Traffic Fatality: Time and Date of Fatality Accident				

☐ **Traffic Fatality:** ☐ Driver ☐ Suspected Driver ☐ Occupant ☐ Pedestrian ☐ Other _____

Send Lab Report To (Please Print): _____ Sample disposal will occur 12 months after analysis reporting date.

Coroner Name: _____ Officer Name: _____

Agency: _____ Agency: _____

Address: _____ Address: _____

Specimens Submitted:

Note: Fill Gray-Stoppered Tube First

- ☐ Blood (Gray-Stoppered Tube)
- ☐ Blood (Green-Stoppered Tube)
- ☐ Blood (Red-Stoppered Tube)
- ☐ Vitreous (Red-Stoppered Tube)
- ☐ Urine (Green-Capped Plastic Container)
- ☐ Other: _____

Venipuncture Site: _____

Analysis Required (Check All Required):

- ☐ Blood Alcohol
- ☐ Vitreous Alcohol
- ☐ Blood Carboxyhemoglobin
- ☐ Blood Drug Screen
- ☐ Urine Drug Screen
- ☐ Other (Please Specify): _____

Chain of Custody:

From (Name, Agency)	To (Name, Agency)	Date	Time
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

For Lab Use Only:

Specimen Received:

- ☐ In a sealed Postmortem Kit
- ☐ Via Postal Delivery
- ☐ In a Sealed Biohazard Bag
- ☐ Via Other: _____

Case No.: _____

Notes: _____

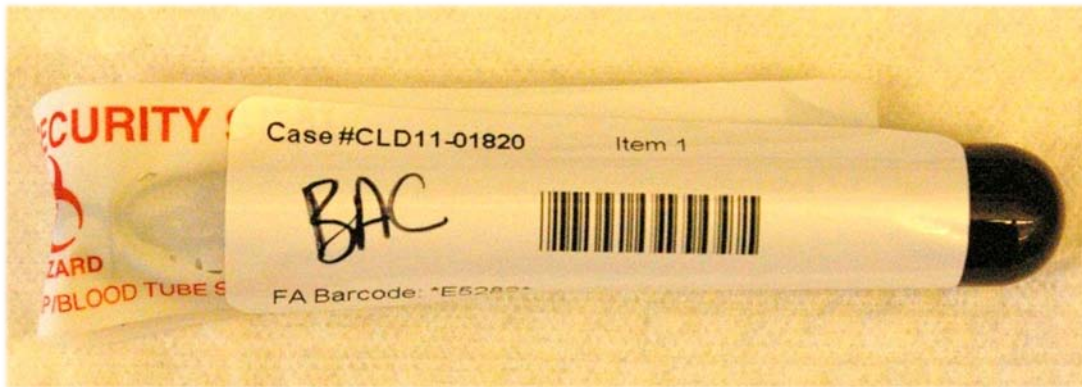
Submitting Samples

- Common Delivery Methods
 - US Mail
 - Personal or Hand Delivery
- Samples do not need to be refrigerated or frozen
- Avoid extended periods of extreme conditions
 - Dash of squad car
 - Postal drops over hot weekends or subzero weekends
- Please use appropriate postage

Laboratory Receipt of Samples

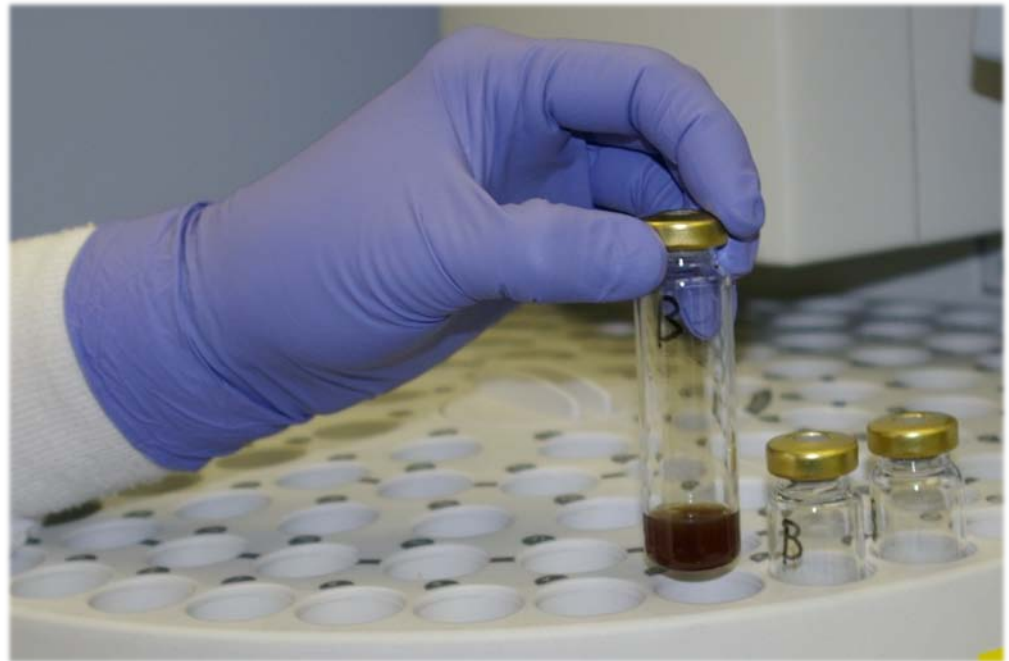
- US Mail samples delivered to laboratory
- Evidence Technician cuts seal on kit box and enters information into LIMS system
- LIMS generates case number (e.g. CLD12-01798)
- Case Number written on Submission Form
- Barcode(s) Placed on Specimen(s)
- Samples Received into the LIMS System
 - Submitted Date and Time
- Evidence Technician Transfers Samples to Refrigerator for Storage

Received Specimens



Alcohol/Volatile Analysis

- Sample Preparation & Batching
- Instrumental Analysis
- QA QC
- Reporting
- Turnaround Times



Sample Preparation & Batching

- Pipette Blood into Headspace Gas Chromatography (HS GC) Vial and Dilute with Internal Standard
 - Hamilton Pipettor Diluter
- Calibration Standards, Controls and Subject Samples
- Samples run in Batches depending on number of samples received that day (10 – 40)



Instrument Analysis

- Headspace Autosampler with Gas Chromatograph



CombiPal



PerkinElmer Turbo Matrix 110

Instrument Analysis

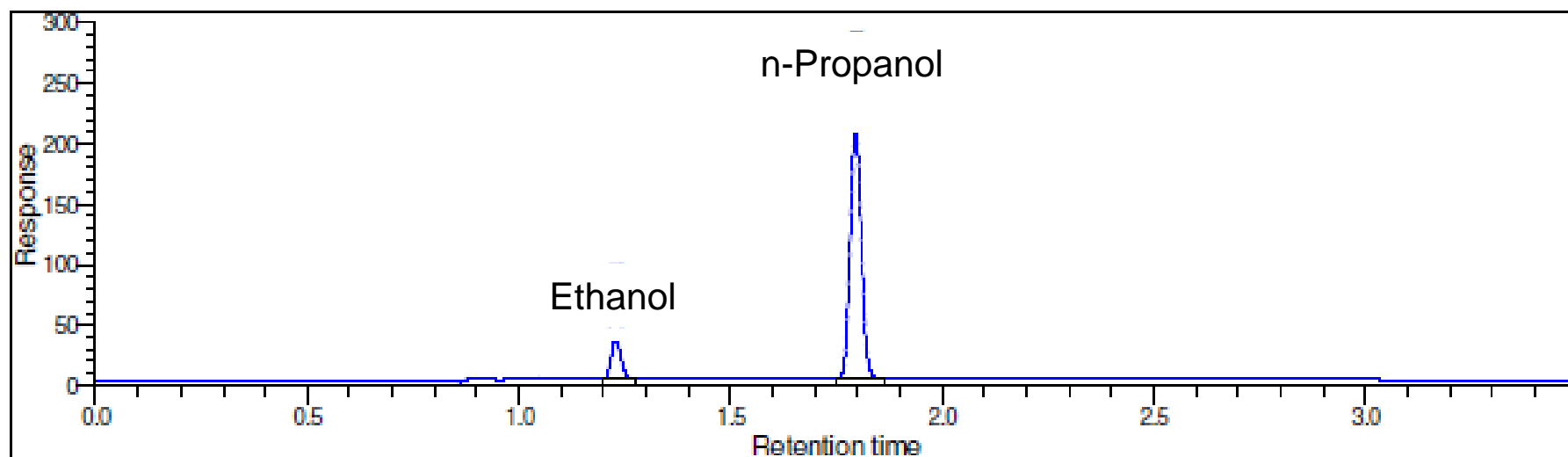
- Data

Sample ID: Control

Alt. ID: Control

Matrix: Blood

Printed: 11-Jul-2011 8:01:51 AM



Quantitation (FID1)

Retention Time	Name	Area	g/100mL
1.229	Ethanol	46.840	0.0986
1.795	n-Propanol	375.939	1.0000

QA QC

- Correlation Coefficient ≥ 0.999
- Controls $\pm 5\%$ of known value
 - e.g. 0.100 g/100 mL \Rightarrow 0.095 g/100 mL - 0.105 g/100 mL
- Duplicates of Subject Samples Relative Difference $< 3\%$
 - Now collecting data to 4 decimal places
 - Reporting lowest of duplicate analysis
 - Lowest result truncated to 3 decimal places
 - e.g. 0.1226 and 0.1236 g/100 mL
 - Average = 0.1231 g/100 mL
 - $\text{Percent Relative Difference} = \frac{\text{Difference } |SSP1 - SSP2|}{\text{Average } (SSP1, SSP2)} \times 100 \Rightarrow \frac{0.0010}{0.1231} \times 100 = 0.812\%$
 - Reported result = 0.122 g/100 mL
 - g/100 mL = weight %

Reporting

- Toxicology
Alcohol/Volatiles
Analytical Report



OFFICE OF ATTORNEY GENERAL
Crime Laboratory Division
2641 East Main Avenue
Bismarck, ND 58501-5044

Tel. (701) 328-6159
(800) 296-2054
Fax (701) 328-6185

TOXICOLOGY ALCOHOL/VOLATILES ANALYTICAL REPORT

Case Number: CLD11-00039
Subject: John D. Doe
Report Date: September 20, 2011
Report To: Luke R. Beasley
Submitting Agency: Bismarck Police Department
Agency Case Number:
Submitted Date/Time: August 26, 2011 09:14
Delivery Method: US Mail
Collection Kit: Item 1
Sealed Container - Yes
Labeled Tube or Container - Yes

Item(s) Submitted:

Item 1: One sealed grey stoppered tube containing 5 mL of blood

Summary of Analysis:

Item	Test	Results	Method	Instrument
Item 1	Alcohol/Volatile Analysis	Ethanol 0.012 g/100mL	Approved Method to Conduct Blood Alcohol Analysis (Rev. 0.0)	PE Clarus 500 GC SN: 650S09110508

Disposition:

All items: Sample disposal will occur 12 months after analysis reporting date.

The results and conclusions in this report are the opinions and interpretations of the analyst(s) from the analysis of submitted evidence.

Sincerely,

Crime Laboratory Division

Janelle L Portscheller
Forensic Scientist

Analysis Performed:
Alcohol/Volatile Analyst

Turnaround Times

- Alcohol/Volatile Analysis
- Average of 6 days from sample receipt at the laboratory

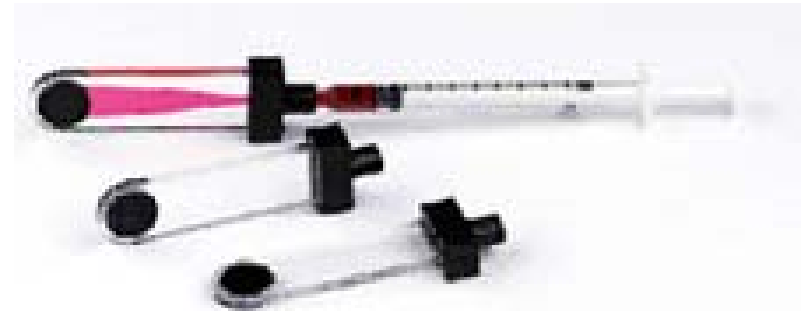


Other Volatiles/Inhalants

Isopropanol	Acetone	Methanol	Toluene
1,1-Difluoroethane	Propane	Butane	Methyl <i>i</i> -Butyl Ketone
Diethyl Ether	Dichloromethane	<i>t</i> -Butanol	Methyl <i>t</i> -Butyl Ether
Acetonitrile	<i>n</i> -Hexane	Ethyl <i>t</i> -Butyl Ether	Chloroform
Methyl Ethyl Ketone (MEK)	Ethyl Acetate	Cyclohexane	Isobutanol
Benzene	<i>n</i> -Butanol	Trichloroethene	<i>n</i> -Propanol


Carboxyhemoglobin

- Instrument Analysis
 - Avoximeter
 - OSM3



Carboxyhemoglobin

- Toxicology Carboxyhemoglobin Analytical Report
 - Results less than 10% saturation will be reported as “Less than 10%”
 - Results 10% - 75 % saturation
 - Confirmed on a second instrument if possible
 - Reported as the average truncated to the nearest whole percentage
 - Results greater than 75% saturation will be reported as “Greater than 75%.”

	OFFICE OF ATTORNEY GENERAL Crime Laboratory Division 2641 East Main Avenue Bismarck, ND 58501-5044	Tel. (701) 328-6159 (800) 296-2054 Fax (701) 328-6185
TOXICOLOGY CARBOXYHEMOGLOBIN ANALYTICAL REPORT		
Case Number:	CLD11-00047	
Subject:	Jane R Roe	
Report Date:	September 20, 2011	
Report To:	Dr. John Baird	

Drug Analysis

- Sample Batching
- Sample Preparation
 - Liquid-Liquid Extraction
 - Solid Phase Extraction
- Instrument Analysis
 - LC/MS/MS
 - GC/MS
- QA QC
- Reporting
- Turnaround Times

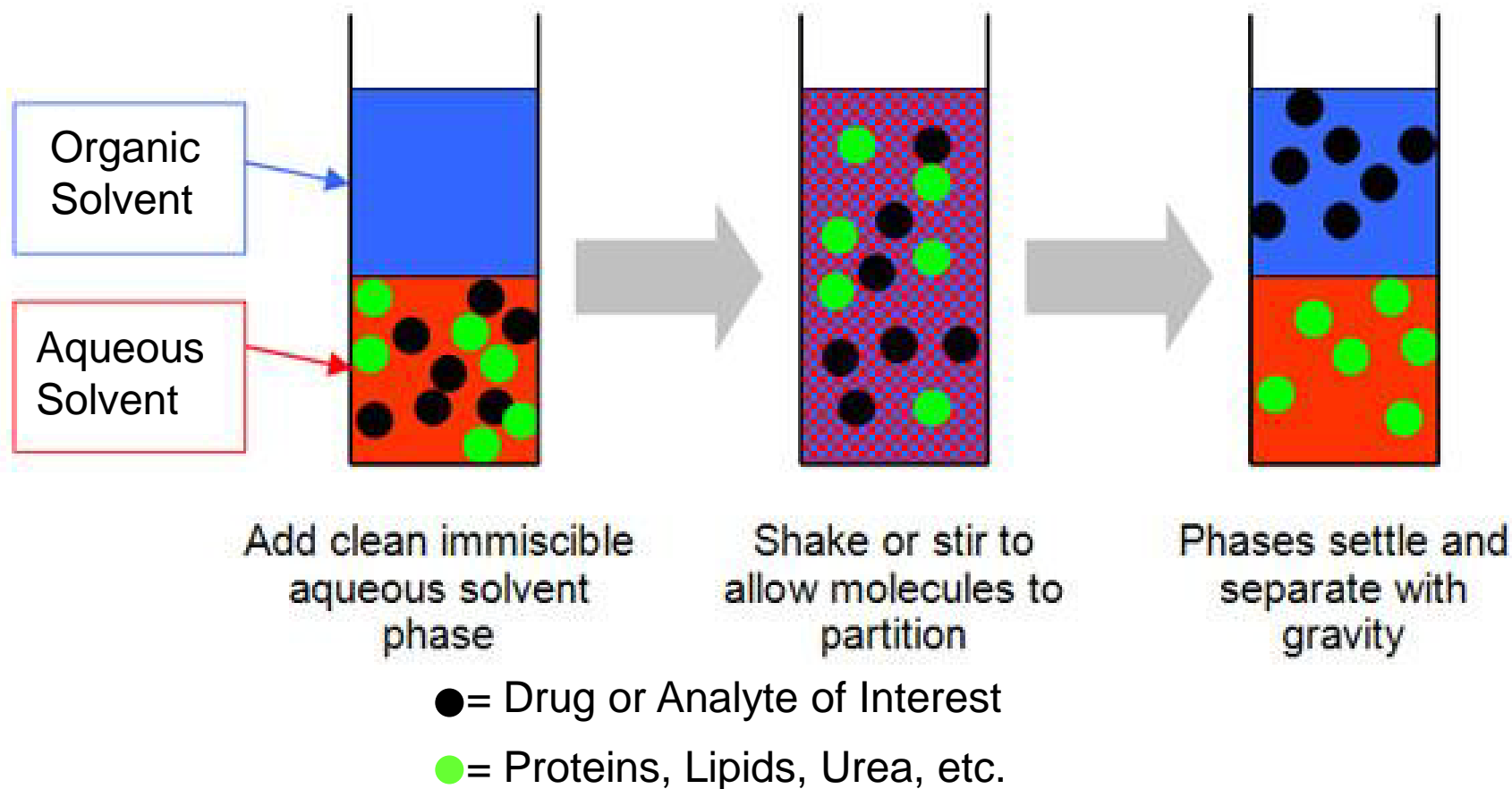


Drug Analysis

- Sample Batching
 - Samples grouped by type & matrix
 - DUI or Corner, Medical Examiner, & Sexual Assault
 - Blood or Urine
 - 20 – 40 samples included in a batch
 - Sample preparation takes 1 – 4 hours
 - Initial Screen for 40 samples takes ~ 48 hours to run on the instrument
 - Data Analysis takes 1 – 3 days
 - Drug Confirmations 2 – 5 days

Drug Analysis

- Sample Preparation
 - Liquid-Liquid Extraction

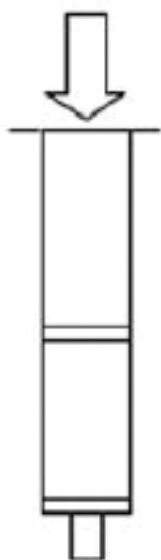


Drug Analysis

- Sample Preparation
 - Solid Phase Extraction

Precondition

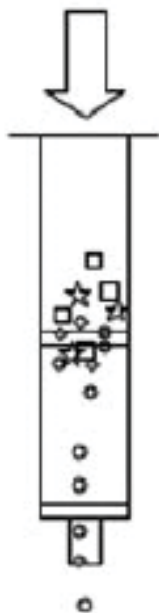
Prepare cartridge to accept sample



1. Methanol or acetonitrile

Load

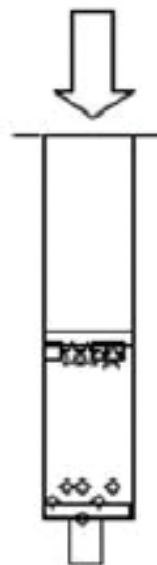
Load sample and rinse reservoir(s)



Weakly retained matrix compounds are eluted

Wash

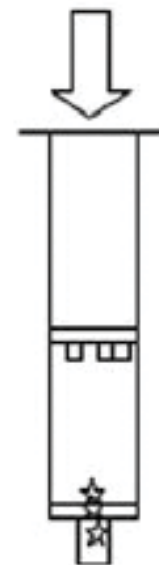
Wash with solvent that won't elute analyte



Analyte and other matrix compounds retained

Elute

Elute analyte in smallest volume possible



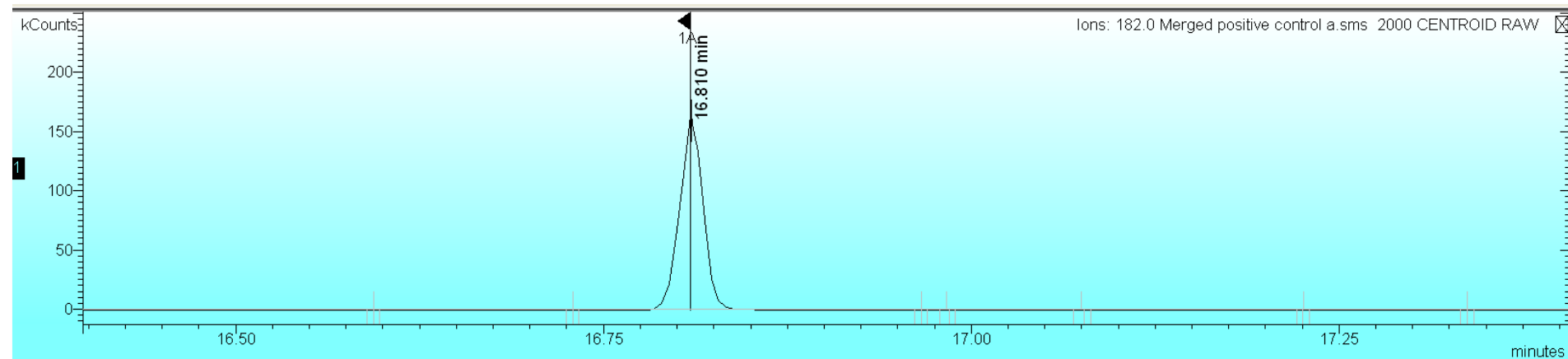
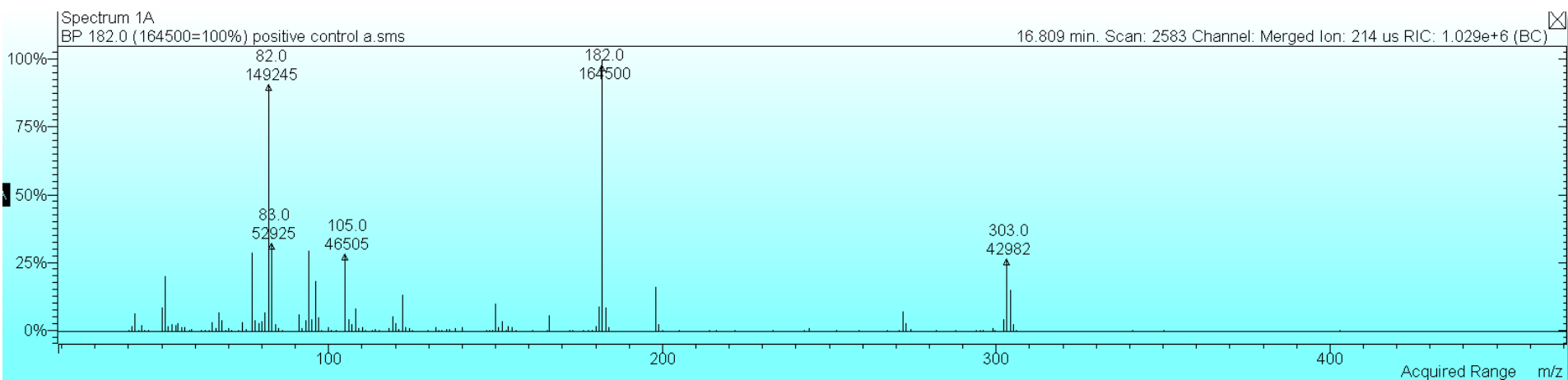
Elute analyte leaving highly retained compounds

Instrument Analysis

- Liquid Chromatography Mass Spectrometry Mass Spectrometry (LC/MS/MS)
- Targeted Screening Approach
 - Instrument parameters set for analytes of interest
 - Traffic Related Offenses 96 drug panel
 - Medical Examiner, Coroner, & Sexual Assault 116 drug panel
 - Analytes chosen
 - Top analytes detected from 2005 – 2008
 - Article “Recommendations for Toxicological Investigation of Drug Impaired Driving” *J. Forensic Sci.* September 2007.
- Gas Chromatography Mass Spectrometry
 - Analyte Confirmation

Instrument Analysis

- Data



QA QC

- Positive Controls run every 10 subject samples
 - A mixture of 5 – 6 Drug Analytes
- Negative Control run one per batch of samples
- Detect Presence of Internal Standard
- Match Retention to known standard
- Match Spectra to known standard
- Blank Solvent or Buffer Injections between each sample



Reporting

- Toxicology Drug Screening Analytical Report
- Page 1



OFFICE OF ATTORNEY GENERAL
Crime Laboratory Division
2641 East Main Avenue
Bismarck, ND 58501-5044

Tel. (701) 328-6159
(800) 296-2054
Fax (701) 328-6185

TOXICOLOGY DRUG SCREENING ANALYTICAL REPORT

Case Number: CLD11-00044
Subject: Jane R. Roe
Report Date: September 20, 2011
Report To: Erin Bertsch
Submitting Agency: Bismarck Police Department
Agency Case Number:
Submitted Date/Time: August 26, 2011 14:37
Delivery Method: Certified Mail (# 123456789)
Collection Kit: Item 1
Sealed Container - Yes
Labeled Tube or Container - No

Item(s) Submitted:

Item 1: One grey stoppered tube containing 5 mL of blood

Summary of Analysis:

Item	Test	Results	Method	Instrument
Item 1	Blood Drug Screen	Cocaine	SPE of Acidic, Neutral, Basic Drugs from Whole Blood; Basic Drug Screening	AB 3200 QTrap LC/MS/MS S/N: AF20880902 Varian GC/MS Saturn 2000 S/N: 04124
Item 1	Blood Drug Screen	Ecgonine Methyl Ester	SPE of Acidic, Neutral, Basic Drugs from Whole Blood; Basic Drug Screening	AB 3200 QTrap LC/MS/MS S/N: AF20880902 Varian GC/MS Saturn 2000 S/N: 04124

Notes:

Alcohol/Volatile results will be issued in a separate report. No screen for the presence of cannabinoids is performed on blood samples. Please see table below for analytes detected by the blood and urine drug screen methods.

Disposition:

All items: Sample disposal will occur 12 months after analysis reporting date.

Reporting

- Toxicology Drug Screening Analytical Report
- Page 2

Blood and Urine Drug Screen Analytes:

Compound Name

3,4-MDA	3,4-MDEA	3,4-MDMA
6-O-Acetylmorphine	7-Aminoclonazepam	7-Aminoflunitrazepam
alpha-Hydroxyalprazolam	Alprazolam	Amitriptyline
Amobarbital	Amphetamine	Benzoyllecgonine
Brompheniramine	Butalbital	Carbamazepine
Carisoprodol	Chlordiazepoxide	Chlorpheniramine
Chlorpromazine	Clomipramine	Clonazepam
Clozapine	Cocaine	Cocaine
Codeine	Cyclobenzaprine	Desalkylflurazepam
Desipramine	Dextromethorphan	Diazepam
Dihydrocodone	Diphenhydramine/Dimenhydrinate	Doxepin
Doxylamine	Ecgonine Methyl Ester	EDDP
Ephedrine/Pseudoephedrine	Fentanyl	Flunitrazepam
Flurazepam	Guaifenesin	Heroin
Hydrocodone	Hydromorphone	Imipramine
Ketamine	Lidocaine	Lorazepam
Maprotiline	Meprobamate	Meprobamate
Methadone	Methamphetamine	Methaqualone
Methylphenidate	Midazolam	Morphine
Nitrazepam	Norcocaine	Nordiazepam
Nortentanyl	Norketamine	Normepidine
Norpropoxyphene	Nortriptyline	Olanzapine
Orphenadrine	Oxazepam	Oxycodone
Oxymorphone	PCP (Phencyclidine)	Pentobarbital
Phenobarbital	Phentermine	Phenylpropanolamine (PPA)
Phenytoin	Prazepam	Promethazine
Propoxyphene	Protriptyline	Quetiapine
Secobarbital	Temazepam	Thiopental
Topiramate	Tramadol	Trazodone
Triazolam	Trimipramine	Zaleplon
Zolpidem	Zopiclone	

The results and conclusions in this report are the opinions and interpretations of the analyst(s) from the analysis of submitted evidence.

Sincerely,

Crime Laboratory Division



Janelle L. Portscheller
Forensic Scientist

Analysis Performed:
Blood Drug Screen Analyst

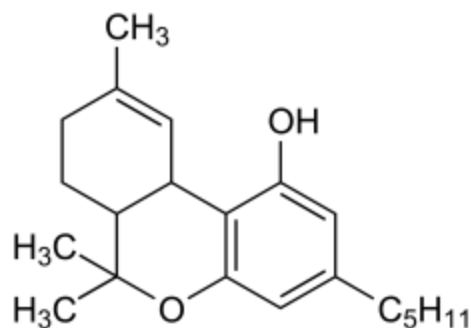
Turnaround Times

- Drug Screening
- Average of 43 days from sample receipt at the laboratory

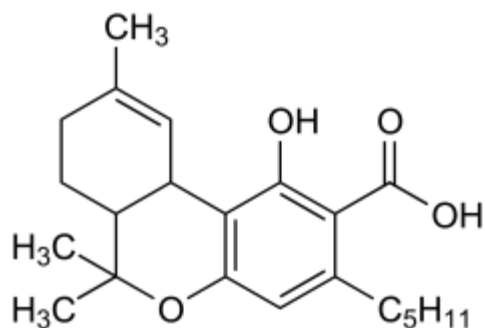


THC Screening in Urine

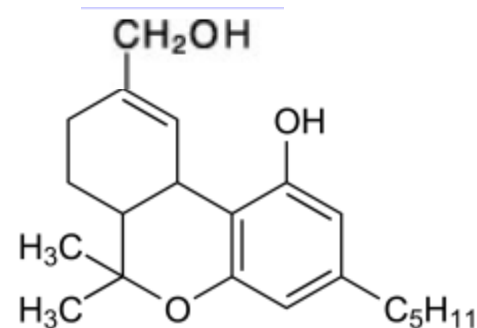
- OnTrak TesTstik™



Δ^9 -Tetrahydrocannabinol
THC



THCA or THC-COOH



11-Hydroxy-THC

THC Screening in Urine

- OnTrak TesTstik™



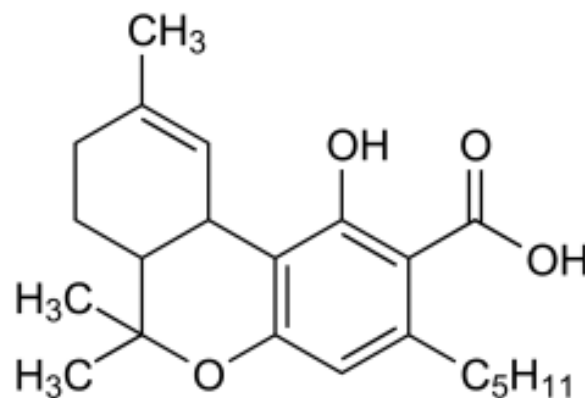
Negative Result



Positive Result

THCA Confirmation in Urine

- Structure specific test
- Sample Preparation
 - Cleave glucuronide
 - Liquid-Liquid Extraction
 - Derivatize
- GC/MS Analysis
- Report Levels over 15 ng/mL



Δ^9 -Tetrahydrocannabinolic Acid
(THCA or THC-COOH)

THC Reporting

- Toxicology Drug Screen Analytical Report

Summary of Analysis:

Positive

Item	Test	Results	Method	Instrument
Item 5	Cannabinoid Screen/TesTstik® THC	Positive	Cannabinoid Screening in Urine	Qualitative Test. No instrument was used.
Item 5	Cannabinoid Confirmation/GC-MS	Positive	THCA Confirmation	Varian GC/MS Saturn 2000 S/N:04124

Summary of Analysis:

Negative

Item	Test	Results	Method	Instrument
Item 5	Cannabinoid Screen/TesTstik® THC	Positive	Cannabinoid Screening in Urine	Qualitative Test. No instrument was used.
Item 5	Cannabinoid Confirmation/GC-MS	Negative, Below lower level of cut off of 15 ng/mL THCA	THCA Confirmation	Varian GC/MS Saturn 2000 S/N:04124

Summary of Analysis:

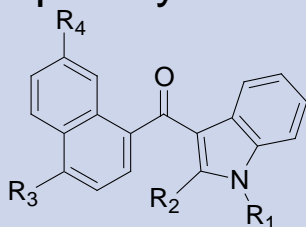
Negative

Item	Test	Results	Method	Instrument
Item 5	Cannabinoid Screen/TesTstik® THC	Positive	Cannabinoid Screening in Urine	Qualitative Test. No instrument was used.
Item 5	Cannabinoid Confirmation/GC-MS	Negative, THCA not detected	THCA Confirmation	Varian GC/MS Saturn 2000 S/N:04124

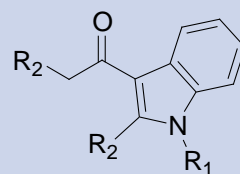
Current Challenges

- Synthetic Cannabinoids

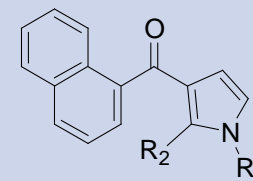
Naphthoylindoles



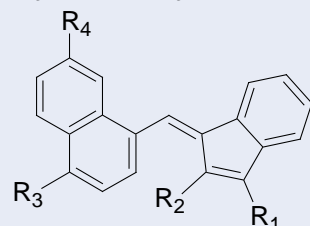
Naphthylmethyindoles



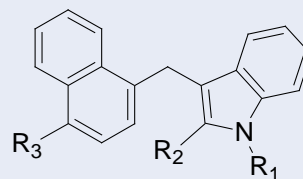
Naphthoylpyrroles



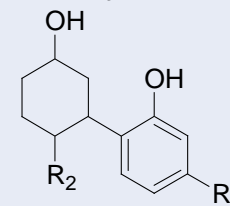
Naphthylmethyindenenes



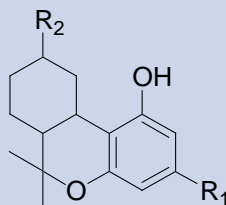
Phenylacetylindoles



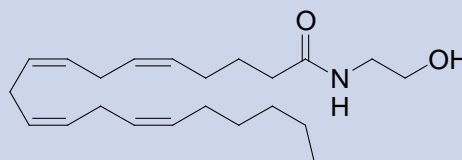
Cyclohexylphenols



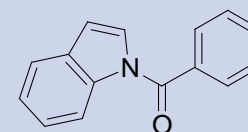
Classical Cannabinoids



Endocannabinoids



Benzoylindoles



Current Challenges

Redwood Toxicology

URINE TESTING:

- Urine test identifies synthetic cannabinoids (JWH-018 and JWH-073) and their metabolites

MedTox

SYNTHETIC AND DESIGNER DRUG TESTING



The use of synthetic and designer drugs is a dangerous, deadly drug trend that continues to be a problem throughout the United States. MEDTOX is continually developing assays to detect the presence of these hazardous substances.

NMS Lab

ANNOUNCEMENTS



NMS Labs Unveils **ELISA Assay** for Synthetic Cannabinoids in Urine.
Read about it.

NMS Labs **Expands its Synthetic Cannabinoids Lab Tests** in Urine to Keep Pace with Changes in Compounds Found in "Fake Pot."
Read about it.

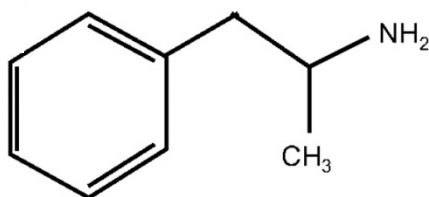
NMS Labs Publishes **White Paper on Synthetic Cannabinoids** Method Development and Validation.
Read about and request a copy.

NMS Labs synthetic cannabinoids blood test now includes **12 compounds**.
Learn more.

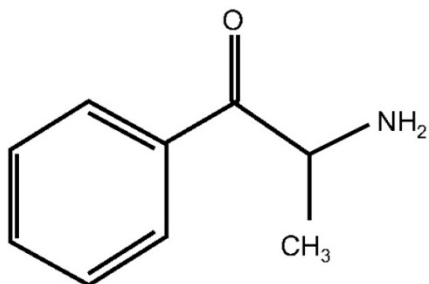
Current Challenges

- Synthetic Cathinones (Bath Salts)

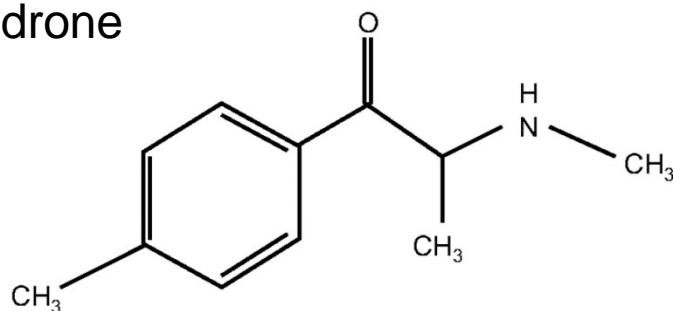
Amphetamine



Cathinone



Mephedrone



NMS

Testing performed at NMS Labs for designer drugs found in "bath salts" consistent with Pennsylvania legislation. [Read about it.](#)



Future Goals

- Drug Analyte Quantitation
 - Begin with Major Drug Classes
 - What does the number mean?
 - More QA QC
- Qualitative and Quantitative Analysis of THC, THCA, and 11-Hydroxy-THC in whole blood



Questions



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<http://www.ag.nd.gov/CrimeLab/CrimeLab.htm>
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